

THAT WHICH IS CLAIMED IS:

1. A modular free space optical (FSO) communications device comprising:

an adaptive optics (AO) module comprising an AO housing and at least one AO device carried thereby; and

an interchangeable optical relay (OR) module comprising an OR housing and at least one OR device carried thereby;

said at least one OR device of a given OR module providing a predetermined focal length range from among different focal length ranges for respective OR modules;

said OR housing and said AO housing being interchangeably connectable and establishing an optical path between said at least one OR device and said at least one AO device when connected.

2. The modular FSO communications device of Claim 1 further comprising a base module connected to said AO module for providing relative movement between said base module and said OR module for optical beam aiming.

3. The modular FSO communications device of Claim 2 wherein said base module comprises a base housing and at least one positioner carried thereby.

4. The modular FSO communications device of Claim 3 wherein said base module further comprises a controller for controlling said at least one positioner.

5. The modular FSO communications device of Claim 4 wherein said base module further comprises a remote station interface connected to said controller for permitting remote control of said at least one positioner.

6. The modular FSO communications device of Claim 1 wherein said at least one OR device comprises a fixed telescopic lens device.

7. The modular FSO communications device of Claim 6 wherein said OR housing has an aperture therein; and further comprising a steering mirror in the optical path between the aperture and said fixed telescopic lens device.

8. The modular FSO communications device of Claim 6 wherein said AO module further comprises an optical fiber interface in the optical path.

9. The modular FSO communications device of Claim 6 wherein said AO module further comprises:
a beam splitter in the optical path; and
a wavefront sensor downstream from said beam splitter and connected to said at least one AO device.

10. The modular FSO communications device of Claim 1 wherein said at least one AO device comprises a deformable mirror and a controller connected thereto.

11. The modular FSO communications device of Claim 1 further comprising a camera carried by said interchangeable OR module.

12. The modular FSO communications device of Claim 1 further comprising a seal for sealing a joint between said OR housing and said AO housing.

13. A modular free space optical (FSO) communications device comprising:

an adaptive optics (AO) module comprising an AO housing and at least one AO device carried thereby; and

an optical relay (OR) module comprising an OR housing and a fixed telescopic lens device having a predetermined focal length range carried by said OR housing;

said OR housing and said AO housing being connectable and establishing an optical path between said at least one OR device and said at least one AO device when connected.

14. The modular FSO communications device of Claim 13 further comprising a base module connected to said AO module for providing relative movement between said base module and said OR module for optical beam aiming.

15. The modular FSO communications device of Claim 14 wherein said base module comprises a base housing and at least one positioner carried thereby.

16. The modular FSO communications device of Claim 15 wherein said base module further comprises a controller for controlling said at least one positioner.

17. The modular FSO communications device of Claim 16 wherein said base module further comprises a remote station interface connected to said controller for permitting remote control of said at least one positioner.

18. The modular FSO communications device of Claim 13 wherein said at least one OR device comprises a fixed telescopic lens device.

19. The modular FSO communications device of Claim 18 wherein said OR housing has an aperture therein; and further comprising a steering mirror in the optical path between the aperture and said fixed telescopic lens device.

20. The modular FSO communications device of Claim 18 wherein said AO module further comprises an optical fiber interface in the optical path.

21. The modular FSO communications device of Claim 18 wherein said AO module further comprises:
a beam splitter in the optical path; and
a wavefront sensor downstream from said beam splitter and connected to said at least one AO device.

22. The modular FSO communications device of Claim 13 wherein said at least one AO device comprises a deformable mirror and a controller connected thereto.

23. The modular FSO communications device of Claim 13 further comprising a camera carried by said interchangeable OR module.

24. The modular FSO communications device of Claim 13 further comprising a seal for sealing a joint between said OR housing and said AO housing.

25. A free space optical (FSO) communications system comprising:

first and second modular FSO communications devices aligned for optical communication therebetween, each comprising

an adaptive optics (AO) module comprising an AO housing and at least one AO device carried thereby, and

an interchangeable optical relay (OR) module comprising an OR housing and at least one OR device carried thereby,

said at least one OR device of a given OR module providing a predetermined focal length range from among different focal length ranges for respective OR modules,

said OR housing and said AO housing being interchangeably connectable and establishing an optical path between said at least one OR

device and said at least one AO device when connected.

26. The FSO communications system of Claim 25 wherein each of said first and second modular FSO communications devices further comprises a base module connected to said AO module for providing relative movement between said base module and said OR module for optical beam aiming.

27. The FSO communications system of Claim 26 wherein said base module comprises a base housing and at least one positioner carried thereby.

28. The FSO communications system of Claim 27 wherein said base module further comprises a controller for controlling said at least one positioner.

29. The FSO communications system of Claim 28 wherein said base module further comprises a remote station interface connected to said controller for permitting remote control of said at least one positioner.

30. The FSO communications system of Claim 25 wherein said at least one OR device comprises a fixed telescopic lens device.

31. The FSO communications system of Claim 25 wherein said at least one AO device comprises a deformable mirror and a controller connected thereto.

32. The FSO communications system of Claim 25 wherein each of said first and second modular FSO communications devices further comprises a camera carried by said interchangeable OR module.

33. A free space optical (FSO) communications system comprising:

first and second modular FSO devices aligned for optical communication therebetween, each comprising an adaptive optics (AO) module comprising an AO housing and at least one AO device carried thereby, and

an optical relay (OR) module comprising an OR housing and a fixed telescopic lens device having a predetermined focal length range carried by said OR housing,

said OR housing and said AO housing being connectable and establishing an optical path between said at least one OR device and said at least one AO device when connected.

34. The FSO communications system of Claim 33 wherein each of said first and second modular FSO communications devices further comprises a base module connected to said AO module for providing relative movement between said base module and said OR module for optical beam aiming.

35. The FSO communications system of Claim 34 wherein said base module comprises a base housing and at least one positioner carried thereby.

36. The FSO communications system of Claim 35 wherein said base module further comprises a controller for controlling said at least one positioner.

37. The FSO communications system of Claim 36 wherein said base module further comprises a remote station interface connected to said controller for permitting remote control of said at least one positioner.

38. The FSO communications system of Claim 33 wherein said at least one OR device comprises a fixed telescopic lens device.

39. The FSO communications device of Claim 33 wherein said at least one AO device comprises a deformable mirror and a controller connected thereto.

40. The FSO communications device of Claim 33 wherein each of said first and second modular FSO communications devices further comprises a camera carried by said interchangeable OR module.

41. A free space optical (FSO) communications method comprising:

providing an adaptive optics (AO) module comprising an AO housing and at least one AO device carried thereby;

selecting one of a plurality of interchangeable optical relay (OR) modules based upon a desired focal length range, each OR module comprising an OR housing and at least one OR device carried thereby, and each at least one OR device of a given OR module providing a predetermined focal length range from among different focal length ranges for respective OR modules; and

interchangeably connecting the OR housing and the AO housing to establish an optical path between the at least one OR device and the at least one AO device.

42. The method of Claim 41 further comprising connecting a base module to the AO module for providing relative movement between the base module and the OR module for optical beam aiming.

43. The method of Claim 42 wherein the base module comprises a base housing and at least one positioner carried thereby.

44. The method of Claim 43 wherein the base module further comprises a controller for controlling the at least one positioner.

45. The method of Claim 44 wherein the base module further comprises a remote station interface connected to the controller for permitting remote control of the at least one positioner.

46. The method of Claim 41 wherein the at least one OR device comprises a fixed telescopic lens device.

47. The method of Claim 41 wherein the at least one AO device comprises a deformable mirror and a controller connected thereto.

48. The method of Claim 41 further comprising providing a camera to be carried by the interchangeable OR module.